

# IMS President introduces Membership Survey

Regina Liu, the current IMS President, wanted to find out more about who IMS members are, what you want, and how the IMS can better serve you. She writes a preamble to the IMS 2021 Membership Survey Report below:

The IMS recently conducted a survey to assess how effective it is in representing our profession, and how it can better serve its members. We are grateful that more than 1800 members have responded to the survey, many with heartfelt comments. We thank those who have responded, and we **would like all members to know that their input is always welcome and valued**, even without the survey.

The survey has collected useful information in providing a broad vision for the IMS to move forward. The survey data has been thoroughly analyzed and thoughtfully summarized in the report prepared by Junhui Cai, Nicole Pashley and Linda Zhao, on pages 6–9.

In the report, two action items stand out:

- 1) **Broader Future Directions:** there is a clear wish from the respondents to see the IMS respond to the unprecedented expansion of our profession to grow in the directions of **machine learning and data science**, broadly defined.
- 2) **Membership Base Expansion:** the data indicate the need for the IMS to strengthen its membership drive effort, to:

- (i) retain its **student members** after graduation and encourage them to participate in the **IMS New Researcher Group (NRG)**,  
and
- (ii) recruit more members from **emerging areas of data science, underrepresented groups and from regions outside of North America**.

It is gratifying to see that many have expressed their willingness to volunteer for IMS service. The IMS needs you and would love to know who you are! Please contact Elyse Gustafson ([erg@imstat.org](mailto:erg@imstat.org)) or me ([president@imstat.org](mailto:president@imstat.org)). We welcome your participation in IMS activities.

There is an oversight that I must apologize for. I had announced at the beginning of the survey that the first 25 respondents would receive a free one-year membership. As it turns out, our survey design was so thorough in protecting data privacy that it would not allow us to identify the respondents at all. I would like to apologize to those first 25 respondents, and, instead, **set aside these 25 free memberships in the IMS gift account for those who are in need of such support**. Please contact Elyse Gustafson, at [erg@imstat.org](mailto:erg@imstat.org), if you would like to be considered for this gift membership.

This survey would not have been possible without the time and effort of many volunteers. In particular, I would like to thank Jean Opsomer, Nicole Pashley and Nicole Lazar for their meticulous efforts in designing the survey, Elyse Gustafson for her gentle yet persistent nudging to encourage responses, and Junhui Cai, Nicole Pashley and Linda Zhao for their excellent survey report, presented on the following pages of this issue.

*Regina Liu*

IMS President 2020–2021  
[president@imstat.org](mailto:president@imstat.org)

## Claim one of 25 free IMS gift memberships

If you need financial support, please write to Elyse Gustafson to ask to be considered for a free IMS gift membership (see Regina's article for details...)



# 2021 IMS Membership Survey: Report

Junhui Cai (UPenn), Nicole E. Pashley (Rutgers) and Linda Zhao (UPenn) report on the results of the recent survey of IMS members:

IMS conducted a survey of members in March and April 2021. It is the second membership survey of this kind after the first one conducted at the end of 2013 and published in 2014 (Opsomer, 2014). The goal of the survey is to assess how the IMS represents the members of our profession, and how it can better serve its members. In addition, our community has experienced an unprecedented period of growth in recent years, leading to possible shifts in IMS member demographics. Interested readers are encouraged to see our full report at [http://jh-cai.com/docs/IMS\\_Survey\\_full.pdf](http://jh-cai.com/docs/IMS_Survey_full.pdf), which provides more details and graphs, including for questions related to member preferences for events and communications.

The survey was sent to 4,697 members who opted in to receive emails (among all 4,287 active regular members and 621 life members, in total 4,908 members) and 1,861 responded. The previous survey in 2013 was sent to 4,561 active members, and 1,492 responded. The response rate increased from 33% in 2013 to 40%.

Overall, IMS has seen exciting growth in student members. Compared with the 2013 survey, more respondents are working in applied areas. Further, the most popular area for the respondents to work in is statistics, followed by data science/machine learning, and then probability. The background of the respondents is diverse, though primarily academics and students. The majority of respondents have PhDs. There are indications that the international presence of IMS has seen some increase in recent years. Unfortunately, the gender gap among the respondents has seen a backward trend, with males representing a much larger proportion of respondents than females (4-to-1 male vs. female).

The analyses and results are post-stratified by student status, as done in the previous survey analysis. We make no other attempts at creating survey weights and non-responses for questions are removed.

## Demographics: Education, age, gender, and geography

First, we examine the educational background of the respondents. Table 1 shows the percentage of the highest degree obtained by decade during which that degree was obtained, among the respondents who reported both the highest degree and decade. Given the nature of IMS, it is not surprising that PhDs dominate, although the proportion has declined since 2013. The higher proportion of masters and undergraduates in the most recent decades (2010s and 2020s), is likely due to individuals still pursuing their education. Figure 1 shows the comparisons between the 2013 and 2021 survey of the highest degree obtained.

**Table 1: Percentage of respondents with the highest degree obtained by decade.**

Degree	1960s/ prior	1970s	1980s	1990s	2000s	2010s	2020s	All
Doctorate	4.0	7.9	10.4	11.2	13.1	14.9	4.8	66.2
Masters	0.2	0.1	0.2	0.4	1.3	18.0	5.0	25.1
Undergraduate	0.0	0.1	0.1	0.1	0.0	5.6	2.7	8.7
All	4.2	8.1	10.6	11.7	14.4	38.5	12.5	100.0

**Figure 1: Distribution of highest degree obtained comparing the 2013 and 2021 survey.**

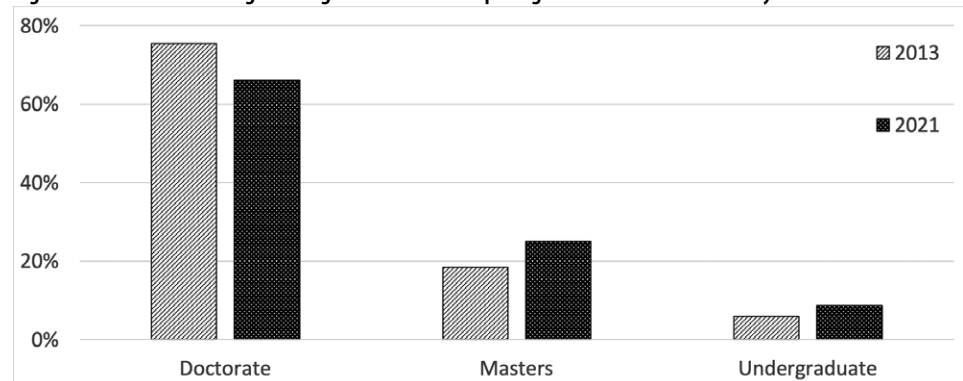


Table 2 [right] shows the difference in the geographic distribution of respondents by continent they spend most of their time in between the 2013 and 2021 survey. The number of respondents in Asia has seen a dramatic increase. The number in Asia is now larger than the number in Europe. The percent of respondents in Africa also almost doubled since 2013.

**Table 2: Geographic distribution of respondents comparing the 2013 and 2021 survey.**

Continent	2013 (%)	2021 (%)
Africa	1.7	3.3
Asia	12.5	21.4
Europe	20.0	16.5
North America	61.1	55.2
Oceania	3.4	2.1
South America	1.3	1.4

Figure 2 [next page] shows the percentage of respondents by age and gender among those who reported both age and gender. Gender is highly skewed towards males, close to

4-to-1 male vs. female overall. The balance was improving for the younger members in the 2013 survey, approaching 2-to-1 among respondents in their 20s and below. However, the improving balance scaled back to close to 3-to-1 in the 2021 survey, with the most imbalance from Africa, South America, and Oceania, followed by Europe, Asia, and North America. As a reference point, the ASA in 2016 reported about 34.6% female and 65.4% male members, of the 85.2% of members that disclosed their gender (Ghosh-Dastidar, B., Tolpadi, A., & Stangl, D., 2016).

Approximately (unweighted) 3.2% of respondents chose not to disclose their gender (including non-response to the question), identified as non-binary, or chose to self-describe.

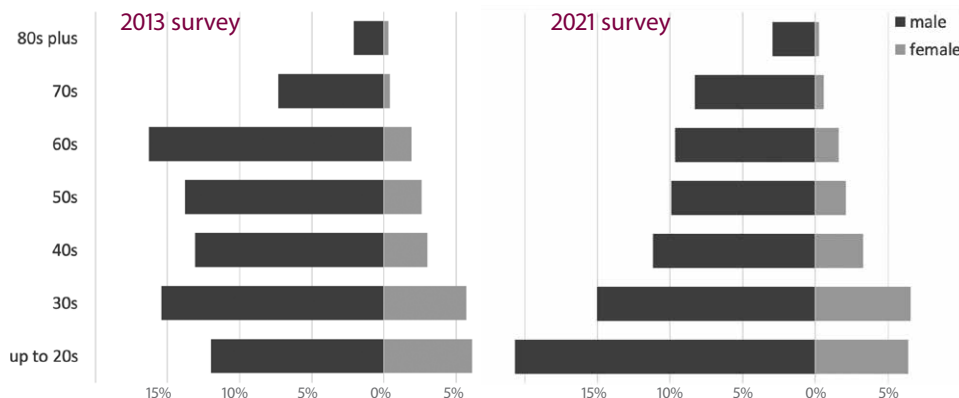
A noteworthy change in the age distribution from 2013 to 2021 is an increase in the proportion of respondents in their 20s and younger (from 18.1% in 2013 to 27.6% now). Figure 3 shows these numbers broken up by student status. Unsurprisingly, student respondents tend to be younger than non-student respondents.

**Professional activities: Occupation, Primary field, and New Researchers Group**

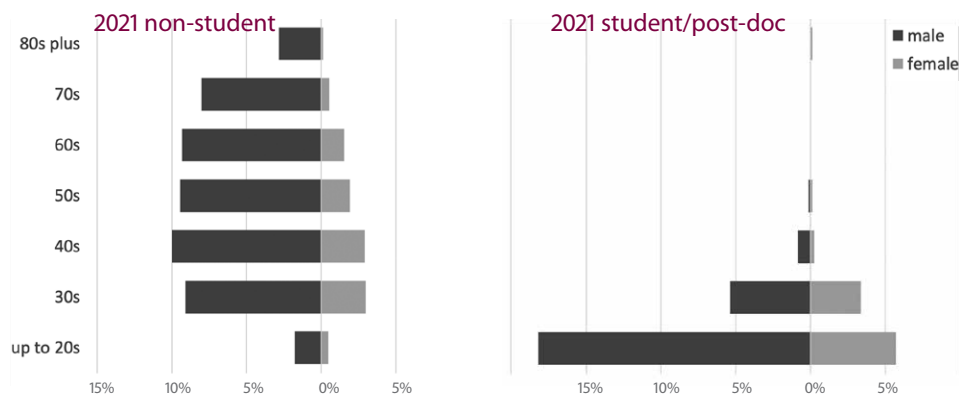
Table 3 [right] shows the current employment status of the respondents, again broken down by decade of degree and among those who reported employment status and decade of degree. Approximately 48% of the respondents are employed by academic institutions and close to 35% are post-docs or students (recall these numbers are post-stratified by student status based on true proportion of student members in IMS). Comparing the employment status to that in the 2013 survey, as shown in Figure 4 [right], the concentration in academia is even higher in 2021 and student membership accounts for over 30% of total members, up from about 20% in 2013.

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**Figure 2: Percentage of respondents by age and gender comparing the 2013 and 2021 survey**



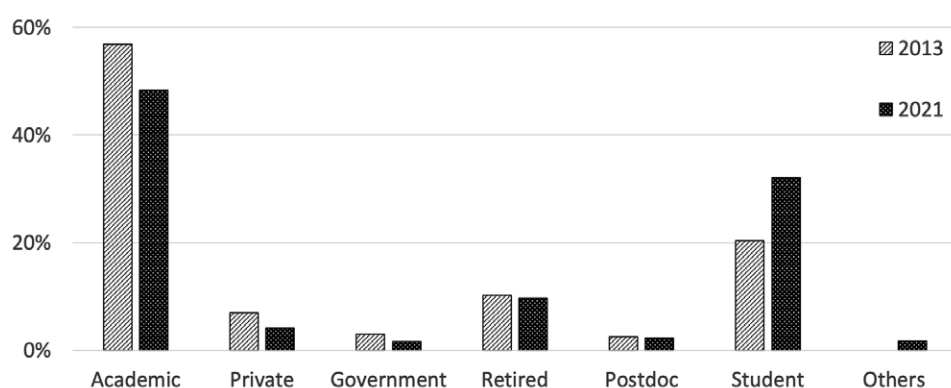
**Figure 3: Percentage of 2021 respondents by age and gender, broken down by student status**



**Table 3: Distribution of current occupation by decade of highest degree earned.**

Occupation	1960s/ prior	1970s	1980s	1990s	2000s	2010s	2020s	All
Academic	1.0	2.8	7.8	10.1	12.4	13.1	1.3	48.4
Private	0.1	0.2	0.5	0.6	0.7	1.2	0.8	4.2
Government	0.0	0.2	0.1	0.4	0.3	0.5	0.1	1.6
Retired	3.0	4.3	1.9	0.4	0.0	0.1	0.0	9.8
Postdoc	0.0	0.0	0.0	0.0	0.0	1.3	1.0	2.3
Student	0.0	0.0	0.0	0.1	0.8	21.4	9.8	32.2
Others	0.0	0.5	0.3	0.1	0.2	0.4	0.1	1.7
All	4.1	8.0	10.6	11.7	14.3	38.1	13.3	100.0

**Figure 4: Distribution of current occupation comparing the 2013 and 2021 survey.**



**Table 4: Distribution of respondents by primary field including statistics (theory, methodology or applied) and by primary field including probability (theory or applied). Numbers are percentages.**

		Statistics		
		Yes	No	All
Probability	Yes	17.5	11.3	28.8
	No	64.0	7.2	71.2
	All	81.5	18.5	100.0

We now turn to the primary area(s) of research or professional activity reported by the respondents. In addition to the four broad categories from the 2013 survey—applied statistics, statistical theory, probability theory and applied probability—the 2021 survey introduced two new categories of “statistical methodology” and “data science and/or machine learning.”

Table 4 shows that over 80% of respondents work in statistics (statistical theory, statistical methodology, or applied statistics), similar to the 2013 survey. The proportion who also identify probability as one of their primary fields, in addition to statistics, jumped from 9.0% in 2013 to 17.5% in 2021. However, the proportion of respondents who work in probability and not statistics remains low at around 11.3% (compared to 13.7% in 2013). Tables showing the mix of research in probability or statistics vs data science and/or machine learning among respondents are available in the full report and are summarized here. Data science and/or machine learning is booming and currently 41% of respondents identify it as one of their primary fields. Over 40% of those who work in statistics indicate that they also work in data science; however, less than a third of those who work in probability do so.

Tables 5 and 6 [above center & right] show the proportion of respondents who work in applied areas of statistics or

**Table 5: Distribution of respondents by primary field including applied statistics and by primary field including statistical theory or statistical methodology. Numbers are percentages.**

		Statistical theory/methodology		
		Yes	No	All
Applied statistics	Yes	38.2	14.4	52.6
	No	28.9	18.5	47.4
	All	67.1	32.9	100.0

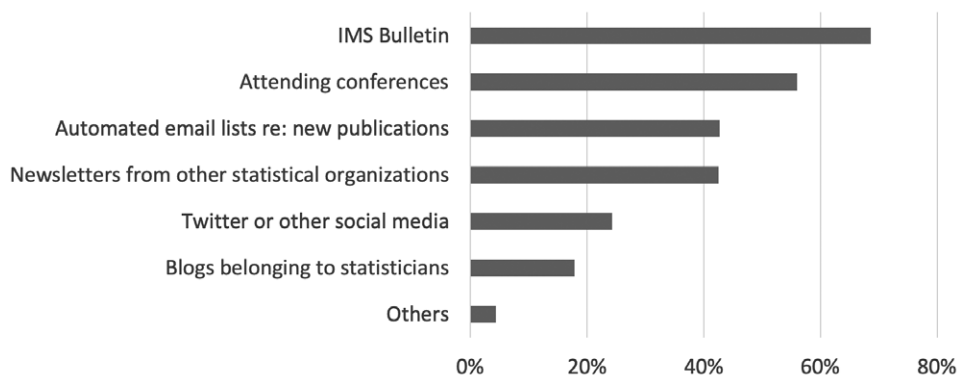
probability. Among those who work in statistical theory and/or methodology, more than half also work in applied statistics, a big jump from 35% in the 2013 survey. Similarly, among those who work in probability theory, almost half also work in applied probability, a surge from less than a quarter in 2013. In fact, more respondents now indicate that they work in applied probability than in probability theory. These trends indicate an increased focus and appreciation of applied work in both statistics and probability.

The IMS New Researchers Group (NRG, <http://groups.imstat.org/newresearchers/>) “focuses on ensuring the continuance of the New Researchers Conference, the establishment and enhancement of a robust web presence, and fostering new ways for young researchers to meet, collaborate, and share their experience” (from <http://groups.imstat.org/newresearchers/about.html>). The NRG invites all members within 10 years of their PhD to join. Unfortunately, less than 25% of the applicable respondents were aware of NRG at the time of the survey. We hope this survey will help spread awareness and further the NRG’s mission of engaging with and empowering new researchers.

**How to better serve the members?**

New questions were introduced on this survey to assess how IMS can better serve its members. We now turn to the preferred methods members use to get statistical news and updates. 97% of the respondents answered this question and the general results are given in Figure 5. The most popular platform used to receive statistical news is the *IMS Bulletin* followed by attending conferences and other statistical organizations’ newsletters. Perhaps surprisingly given their general popularity, Twitter and blogs are the least likely to be a typical source of statistical news for respondents.

**Figure 5: Platforms respondents typically use to learn about statistical news and updates.**



To understand how to better engage with younger and more junior members, a separate analysis of this data was performed, separating individuals who indicated that they are potential NRG members (within 10 years of their PhD) and all others. We will refer to the potential NRG members as “new researchers.” Unsurprisingly, the new researchers show a relatively higher preference for Twitter and blogs as sources of news, but they are still the least likely sources among both groups. For both groups the *IMS Bulletin* and attending conferences are the two most common ways of learning about statistical news, but with the non-new researchers group being more likely to use the *IMS Bulletin* as a source.

An important note here is that there is some obvious selection bias: individuals who read the *IMS Bulletin* and other IMS emails are those who were the most likely to respond to this survey.

The survey also included a question regarding which future events members are most interested in IMS holding or sponsoring. The results are shown in **Figure 6**. 86% of the respondents answered this question. The most popular event type is statistical or data science workshops, followed by virtual events and interdisciplinary events. Focused interest area conferences had the least interest.

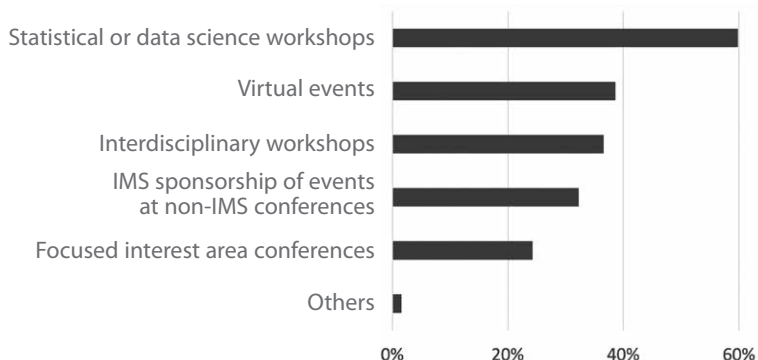
A second analysis was also done splitting the data by whether the respondent is a potential NRG member. This breakdown shows that statistical or data science workshops are most popular among both groups. However, new researchers appear more interested in focused interest area conferences and less interested in virtual events.

We now do an informal look at the responses to open-ended comments on the survey. A very informal classification of the comments shows several themes emerge. The five most common themes are as follows: 1. Encouragement and suggestions to continue virtual and online events; 2. General praise for IMS; 3. Support and suggestions for engaging with data science, machine learning, and AI more; 4. Encouragement to support and engage with young researchers and students; 5. Encouragement to provide more support for members in developing countries.

**Final remarks**

This survey has given us more insights into who IMS members are. It shows that our members are diverse in interests, with clear trends over time towards applied areas and data science/machine learning among respondents. IMS appears to be increasing in international presence, especially in Asia

**Figure 6: Events respondents are interested in IMS holding or sponsoring.**



and Africa. Respondents continue to be primarily in academic positions with PhDs, perhaps pointing to more opportunities to bring in members from other backgrounds. Respondents indicated the usefulness of the *IMS Bulletin* and showed enthusiasm for future IMS events. Excitingly, IMS has increased in student and younger members. The gender imbalance among the respondents in some regions should motivate new efforts in outreach to under-represented members of our fields, especially juniors.

On a final note, Figure 7 [below] is a word cloud of the 300 open ended comments received. Some common words are unsurprising, such as “members,” “statistics,” and “probability,” but we are happy to see among their ranks “good,” “thank,” and “like.”

Thank you to all the members who took the survey.

